

Understanding cold bias: Variable response of skeletal Sr/Ca to seawater $p\text{CO}_2$ in acclimated massive Porites corals

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Table S1. Measured growth and Sr/Ca in individual skeletal units within colonies cultured across a range of seawater $p\text{CO}_2$ conditions representing the Last Glacial Maximum (LGM; pH 8.3), modern day (ambient; pH 8.0) and projected levels for the year 2100 (pH 7.8). Linear extension was measured between the two stain lines marking skeletal growth during the 5 week experimental period. Following SIMS, molar Sr/Ca ratios in the skeleton, and partition coefficients between aragonite and seawater ($K_D^{\text{Sr/Ca}}$), are reported with 95% confidence intervals (95% CI) and the number of analyses per unit (n).

Treatment	Species/ Genotype	Colony ID	Skeletal Unit	Linear Extension (μm)	Sr/Ca ($\mu\text{mol mol}^{-1}$)	95% CI	$K_D^{\text{Sr/Ca}}$	95% CI	n
LGM	<i>P. lutea</i> Gen 1	M3	A	1260	11.90	0.08	0.971	0.010	19
			B	1380	11.98	0.09	0.977	0.011	22
	<i>P. lutea</i> Gen 2	H1	A	770	12.11	0.27	0.988	0.024	10
			B	780	12.17	0.19	0.993	0.018	14
			C	580	12.02	0.41	0.981	0.034	4
	<i>P. lutea</i> Gen 2	C1	A	770	12.26	0.21	1.001	0.019	9
			B	540	12.10	0.16	0.988	0.015	7
			C	450	11.90	0.19	0.971	0.018	5
			D	460	12.38	0.19	1.010	0.018	5
	<i>P. murrayensis</i>	X1	A	500	11.80	0.06	0.963	0.009	6
			B	360	12.05	0.17	0.983	0.016	9
			C	480	11.70	0.12	0.955	0.012	5
Ambient	<i>P. lutea</i> Gen 1	M1	A	1120	11.78	0.11	0.977	0.009	17
			B	840	11.68	0.14	0.969	0.012	9
	<i>P. lutea</i> Gen 2	H2	A	450	11.52	0.12	0.955	0.010	7
			B	460	11.48	0.34	0.952	0.028	6
			C	420	11.36	0.19	0.940	0.016	7
			D	380	11.64	0.32	0.966	0.026	3
	<i>P. murrayensis</i>	X2	A	750	11.86	0.15	0.984	0.013	13
			B	760	11.70	0.23	0.971	0.019	10
	<i>P. murrayensis</i>	U	A	930	11.79	0.09	0.977	0.008	14
			B	730	11.72	0.13	0.972	0.011	6
Year 2100	<i>P. lutea</i> Gen 1	M2	A	480	12.02	0.19	1.016	0.016	8
			B	580	11.95	0.19	1.009	0.016	9
			C	390	11.87	0.19	1.002	0.016	3
			D	430	11.90	0.27	1.005	0.023	4
	<i>P. lutea</i> Gen 2	B2	A	230	11.32	0.25	0.956	0.021	5
			B	230	11.46	0.16	0.968	0.014	5
			C	180	11.65	0.22	0.984	0.019	7
			D	210	11.51	0.42	0.972	0.036	4
	<i>P. murrayensis</i>	A	A	620	11.58	0.19	0.978	0.016	6
			B	370	11.62	0.18	0.981	0.015	6
	<i>P. murrayensis</i>	V	A	480	11.76	0.17	0.993	0.015	8
			B	440	11.50	0.14	0.971	0.012	7

Table S2. Mean linear extension and daily calcification rate in three genotypes of *Porites* spp. cultured at 198, 416, and 750 μatm $p\text{CO}_2$ after >5 months of acclimation.

Seawater $p\text{CO}_2$ (μatm)	<i>P. lutea</i> Genotype 1	<i>P. lutea</i> Genotype 2	<i>P. murrayensis</i>
<i>Linear Extension</i> (μm ; mean \pm 1σ)			
198	1320 \pm 90 ^a	710 \pm 110 ^a and 550 \pm 140 ^{ab}	450 \pm 80 ^a
416	980 \pm 200 ^b	430 \pm 40 ^b	760 \pm 10 ^{ab} and 830 \pm 140 ^b
750	470 \pm 80 ^c	210 \pm 20 ^c	460 \pm 30 ^{ab} and 500 \pm 180 ^{ab}
<i>Daily calcification rate</i> ($\mu\text{mol CaCO}_3 \text{ cm}^{-2} \text{ d}^{-1}$; mean \pm 1σ)			
198	21 \pm 1 ^a	21 \pm 3 ^a and 14 \pm 1 ^b	23 \pm 1 ^a
416	19 \pm 1 ^a	10 \pm 2 ^b	15 \pm 1 ^{bc} and 17 \pm 1 ^{ab}
750	18 \pm 3 ^a	4 \pm 1 ^c	11 \pm 2 ^{bc} and 9 \pm 4 ^{cd}

Linear extension measurements represent the means of 2+ skeletal units over the 5 week experimental period; calcification rates are the mean of 3 weekly whole-colony measurements. Duplicate colonies shown for *P. lutea* Genotype 2 (198 μatm) and *P. murrayensis* (416 and 750 μatm). Within each species/genotype, different letters indicate significant differences between treatments ($p < 0.05$; ANOVA and Tukey post-hoc).

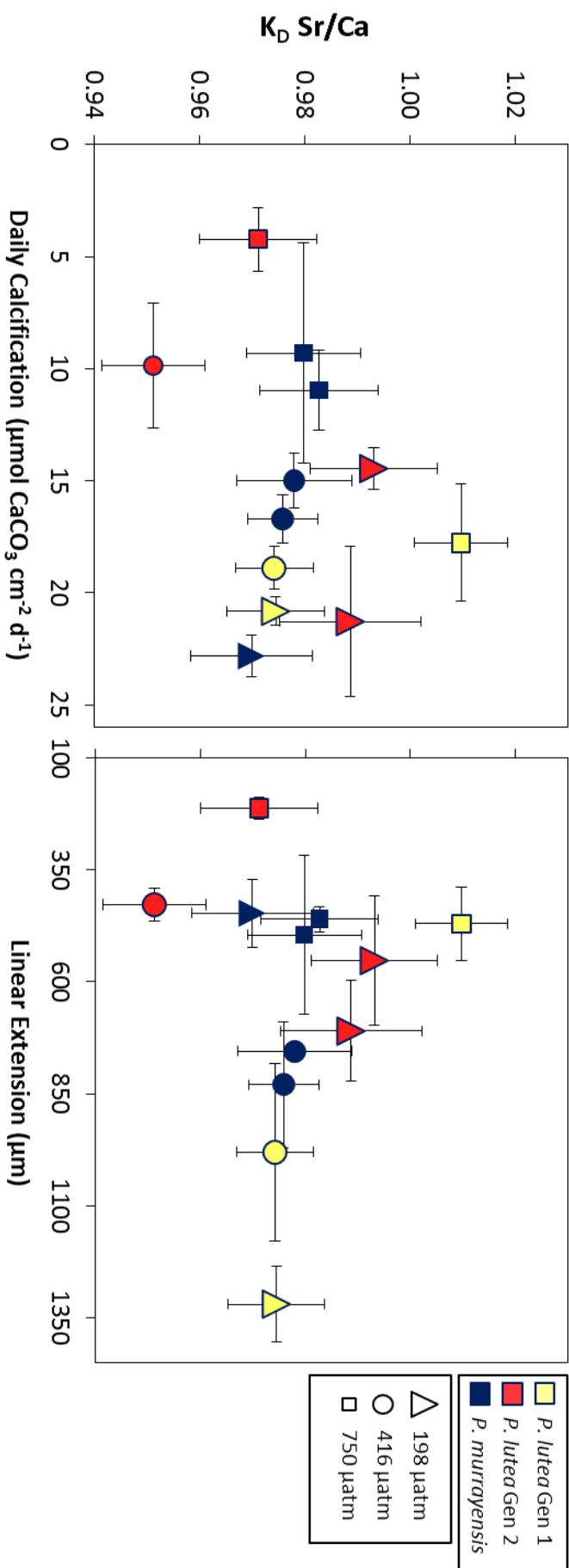


Figure S1. Mean $K_D \text{ Sr/Ca}$ of *Porites* spp. colonies plotted against mean daily calcification rate and linear extension.
 Corals cultured at 198, 416 and 750 μatm $p\text{CO}_2$ are indicated by symbols defined in the key. Error bars are combined 95% confidence limits of seawater and skeletal Sr/Ca measurements ($K_D \text{ Sr/Ca}$); 1 σ of 3 weekly calcification rate measurements; and 1 σ of linear extension measurements between skeletal units.